

MISSISSIPPI WEED CONTROL GUIDELINES

Particular attention has been taken to ascertain that all herbicide treatments in this report are registered with the EPA for use in the manner described. Registrations for specific practices are frequently modified or deleted, often making it impossible for practices suggested in this report to remain current throughout the calendar year. Therefore, the manufacturer's label should be read and observed to prevent misuse of a herbicide. Some herbicide treatments or practices included herein are provided

for through Special Local Need Registrations, Section 24(c). Use directions may be in the form of supplemental labeling, which must be in possession of the user at the time of use. Supplemental labeling for these special uses may be obtained from the dealer or registrant. It is not intended or proposed that any practice suggested in this guide be in violation of existing registration or manufacturer's label.

Precautions

All agricultural chemicals should be handled with care. The manufacturer's label on the container includes precautions for safe handling, which should always be observed. When material is spilled on the body, it should be washed off immediately. In no case, should spray tips be placed to the lips to blow out trash. Many of the materials are flammable and should be handled accordingly.

Aerial application of dicamba, picloram, 2,4-D, and other phenoxy or hormone-type herbicides is regulated by law in Mississippi. 2,4-D, dicamba, and/or MCPA may not be applied by fixed-wing aircraft between April 1 and September 30. 2,4-D and/or MCPA shall not be applied in any form to rice by helicopter between April 1 and September 30, except with special spray equipment and under certain conditions. Before aerial applications of such materials are made, operators should contact the Bureau of Plant Industry, Mississippi Department of Agriculture and Commerce, Mississippi State, Mississippi, relative to compliance with this law and the regulations promulgated thereunder.

Clean spray tanks after the final application of a pesticide and before the application of another pesticide. Failure to clean the spray tank can result in severe crop injury or illegal residues in the harvested commodity. Most pesticide residues can be cleaned from the spray tank using household ammonia. Use clean water to rinse the inside of the spray tank. Use enough water to flush the spray boom hoses and spray tips.

Fill the spray tank with clean water; add enough ammonia to make a 1 percent solution (1 gallon ammonia per 100 gallons water). The ammonia used for cleaning should contain 3 percent active ingredient. Agitate the ammonia solution through the

spray equipment and flush the hoses, booms, and nozzles for at least 15 minutes. When possible, allow sprayer to sit with this solution overnight before draining. Fill the tanks with clean water, agitate the water, and flush the boom with clean water for 5 minutes. Whenever possible, locate mix-load sites and equipment clean-up sites at least 100 feet from any surface water or from direct links to groundwater.

It is best not to use the same spraying equipment for applying both phenoxy-type herbicides, (2,4-D, etc.) and other pesticides unless the crop has good tolerance. Herbicides such as 2,4-D can be satisfactorily cleaned out of sprayers, but some risk still exists when spraying sensitive broadleaf crops.

Injury to fish, birds, honey bees, and mammals may be avoided in these ways:

1. Prevent drift of herbicides to wooded areas occupied by wildlife, drift to land areas not intended for treatments, and drift to bodies of water.
2. Prevent runoff or washoff by rain from treated areas to bodies of water through judicious timing of application.
3. Do not make applications too often or in excessive dosages.
4. Do not apply highly toxic herbicides.
5. Prevent carelessness.
6. Avoid treating extensive areas of water with approved aquatic herbicides in one operation, since the decaying vegetation that would result might deplete oxygen content of the water to the point of causing fish kills.
7. Comply with all restrictions specified on the pesticide label in the Endangered Species Act.

Herbicide Safety

Herbicides should always be handled in such a way that the possibility of harm to nontarget organisms (including man), either through contamination of food and water or by contact, is kept to a minimum. All users should be trained in the proper handling of herbicides and in following the precautions below:

1. Know the material being applied; READ THE CONTAINER LABEL AND UNDERSTAND THE DIRECTIONS for preparing and applying the herbicide, and FOLLOW THE DIRECTIONS.
2. Wear protective clothing specified on the pesticide label and avoid prolonged exposure to herbicides. Special care should be exercised to prevent inhalation and contamination of the skin when handling concentrates (use respirators, goggles, impermeable aprons, and gloves as specified on the label).
3. Avoid contamination of foods or drinking water of man and animals.
4. When herbicide contamination of the body occurs, wash the affected area quickly and thoroughly with soap and water. Wash with soap routinely after each day of spraying.

5. Keep spray equipment clean and in good condition.
6. STORE HERBICIDES IN PROPERLY LABELED CONTAINERS OUT OF REACH OF CHILDREN AND ANIMALS.
7. Dispose of empty containers safely (See Container Disposal Section).
8. **KNOW THE EMERGENCY MEASURES FOR TREATING ACCIDENTAL POISONING.** When illness arises due to a possible overexposure to a herbicide, contact your local physician. **Physicians and other medical authorities may obtain information on the toxicity of herbicides from the Poison Control Center, University Medical Center, Jackson, MS, telephone 1-800-222-1222.**
9. If herbicides get into the eyes, flush the eyes with plenty of water for 15 minutes and call a physician.
10. If a herbicide is swallowed, apply the first-aid treatment printed on the label of the container and call a physician.

Mixing and Handling Herbicides

1. Mix and prepare herbicides in the open or in a well-ventilated place. When handled in close quarters, highly toxic herbicides may cause poisoning through inhalation. Certain volatile herbicides may cause fires or explosions.
2. Open herbicide containers carefully to prevent billowing of dusts or splashing of liquids.
3. Pour herbicides carefully to avoid spills. Triple or pressure rinse empty containers and use the rinse water to fill the spray tank.
4. Use special containers — drums or pails — for mixing herbicides; never use food or beverage containers.
5. Never use your mouth to siphon a herbicide from a container.
6. Do not mix herbicides in concentrations higher than those recommended and measure accurately. This will help ensure application of correct and safe dosages.
7. Avoid spilling concentrates on the skin or clothes, and keep them away from the eyes, mouth, and nose. If a herbicide is spilled, wash it off with soap and water and change contaminated clothing immediately. Launder contaminated clothing before wearing it again. Launder contaminated clothing separately. Do not launder with family wash.
8. Always wear rubber gloves when handling concentrates. Rinse the gloves with water before removing them; do not turn gloves inside out when removing.
9. To safely mix and prepare some herbicides, it is necessary to wear a respiratory device and protective clothing. The container label will indicate if these precautions are needed.
10. Do not smoke, eat, or drink when handling herbicides.

Applying Herbicides

1. Wear the protective clothing prescribed on the container label when applying a herbicide.
2. Do not apply dosages greater than those recommended on the container label.
3. Time your applications to prevent illegal herbicide residues on food, feed, or forage crops; allow the prescribed number of days' interval between the last herbicide application and harvest or grazing.
4. Guard against drift of herbicides onto nearby crops, pastures, or grazing livestock, or onto streams, ponds, lakes, other fish-bearing waters, or other sensitive areas. Do not spray when environmental conditions favor drift. Use of the correct nozzle size, which maximizes the largest droplet size, will aid in minimizing spray drift.
5. Guard against runoff of herbicides into water supply sources. Do not mix or/apply herbicides near dug wells, cisterns, or any other water sources into which they may run or be washed by rain. Do not clean application equipment, dump unwanted herbicides, or dispose of empty containers near these places.
6. When applying spray or dust, work into the breeze or at a right-angle to it; thus, the herbicide will be blown away from instead of onto you.
7. Do not smoke, eat, or drink while applying herbicides.
8. Be careful not to rub eyes or mouth with your hands during applications.
9. If you should feel ill while applying herbicides, stop work at once and get medical attention.
10. At the end of a day's work, bathe and change all clothing. Launder the clothing before wearing it again. Launder contaminated clothing separately, not with family wash.
11. Rubber shoes may be cleaned with soap and water. It is impossible to efficiently decontaminate leather shoes. If your shoes have become heavily contaminated with herbicide, do not wear them again. Dispose of contaminated footwear properly.

Worker Protection Standard

1. Agricultural, forestry, nursery, and greenhouse users are affected by the Worker Protection Standard.
2. Requirements for Worker Protection Standard must be followed when they appear on the pesticide label. This includes providing personal protective equipment, observing restricted-entry intervals (REI), and notifying workers about areas where applications are taking place or where REI's are in effect. Notification may be oral or with signs posted at field entrances or both if required by the label.
3. Generic provisions of providing a decontamination facility, worker training, monitoring of handlers, cleaning, inspection, and maintenance of personal protective equipment, and notification of applications are required.
4. Training for noncertified pesticide handlers and applicators can be provided by: (1) a currently certified restricted-use pesticide applicator, (2) a person currently designated as a trainer of certified applicators or handlers by State, Federal, or Tribal agency having jurisdiction, or (3) a person having completed a "Pesticide Safety Train-The-Trainer" program approved by the State, Federal, or Tribal agency having jurisdiction. Reinforcement training about the specific pesticide being used should be conducted at the time the pesticide is to be handled or applied.
5. The employer must display at a central location information about each application, the name, telephone number, and address of the nearest emergency medical facility, and a WPS pesticide safety poster developed by EPA or an equivalent poster. He must also provide transportation to an emergency medical facility for the employee thought to have been poisoned or injured and supply the treating medical personnel any requested information from the product label. A description of the way the pesticide was used and the circumstances of the worker's exposure to the pesticide must also be given.

Suggestions for Disposal of Excess Pesticides and Pesticide Containers

Owners of excess pesticides should first exhaust the two following avenues before undertaking final disposal:

1. Use the pesticide for the purposes originally intended at the prescribed rate, providing these uses are currently legal.
2. Return pesticide to the manufacturer or distributor.

Recommended Procedures for Disposal of Excess Pesticides

The best way to dispose of excess pesticides is to apply the pesticide according to the label. Cancelled or suspended pesticides are classified as hazardous waste and must be disposed of at a hazardous waste facility. For information on disposal, contact:

Suggestions for Disposal of Excess Pesticides and Pesticide Containers *(continued)*

Mississippi Department of Environmental Quality
 Bureau of Pollution Control
 Division of Hazardous Waste Management
 P. O. Box 10385
 Jackson, MS 39289
 Telephone (601) 961-5171

Recommended Procedures for Disposal of Pesticide Containers and Residues

Containers

Dispose of pesticide containers according to instructions on the pesticide label. As a general rule, (1) containers which held liquid pesticides should be triple or pressure rinsed and either offered for recycling or reconditioning, or disposed of in a permitted solid waste facility. (2) Containers which held dry materials should be completely emptied, triple or pressure rinsed if appropriate, and then either offered for recycling, reconditioning, or disposed of in a permitted solid waste facility.

For information on recycling pesticide containers contact your county Extension office.

Pesticide Residues

Rinsate from pesticide containers and spray equipment should be added to the spray or mix-tank as diluent and sprayed back on the field.

Open burning of pesticide containers is not permissible under Mississippi law.

Recommended Procedures and Criteria for Storage of Pesticides and Pesticide Containers

Temporary storage of highly toxic or moderately toxic pesticides for the period immediately prior to, and of the quantity required for a single application, may be undertaken by the user at isolated sites and facilities where flooding is unlikely, where provisions are made to prevent unauthorized entry, and where separation from water systems and buildings is sufficient to prevent contamination by runoff, percolation, or wind-blown particles or vapors.

General Instructions for Use of Abbreviated Guides

1. Preplant and preemergence herbicide rates are generally related to soil texture and organic matter content. Some herbicides are suggested in these guidelines for a wide range of soil types (sandy to clays); whereas, others are suggested for only a few soil types. The soil organic matter content further defines use rates. Some times low contents prevent use, but generally, rates increase with increasing organic matter content.
2. If a single rate is recommended for a herbicide, use the recommended rate for all soil types and weed conditions described.
3. If a range of rates (2 to 4 lb for example) is recommended, select a rate from within the range in accordance with the size and condition of crop and weeds. For example, the lowest recommended rate of diuron plus surfactant should be used to control a very scattered infestation of newly emerged crabgrass in 6-inch cotton. In cotton more than 10 inches tall, the highest rate should be used if the problem consists mainly of crabgrass 2-3 inches tall and thickly spaced in the row.
4. If a range of rates (2 to 3 to 4 lb for example) is recommended for soil-applied herbicides, the specific rate should be chosen in accordance with soil texture and organic matter content of the soil. First, use the lower range for soils in the sandy textural class and the higher range for loams, clay loams, or, where recommended, for clays. Second, within either the low or high range select the specific rate in accordance with the organic matter content of the soil. Use the lower side of the range where organic matter is low and the higher side of the range where organic matter is high. Although exact knowledge concerning the organic matter content of soils is generally not available, there are several rough guides that can be used. Soils high in organic matter tend to darker and more easily cultivated than similar soils low in organic matter. Plants grown in high organic soils suffer less from drought than plants grown in similar soils with low organic matter. Soils of the Midsouth with less than one percent organic matter should be considered low in organic matter while those with 1.5 percent should be considered high in organic matter for purposes of herbicide use.

FACTORS TO CONVERT BROADCAST RATE/A TO A BAND RATE AT VARIOUS BAND AND ROW WIDTHS.

Band width inches	Row Spacing — Inches							
	20	24	28	30	32	36	38	40
6	0.3	0.25	0.21	0.20	0.19	0.17	0.16	0.15
8	0.4	0.33	0.29	0.27	0.25	0.22	0.21	0.20
10	0.5	0.42	0.36	0.33	0.31	0.28	0.26	0.25
12	0.6	0.50	0.43	0.40	0.37	0.33	0.31	0.30
14	0.7	0.58	0.50	0.47	0.44	0.39	0.37	0.35
16	0.8	0.67	0.57	0.53	0.50	0.44	0.42	0.40
18	0.9	0.75	0.64	0.60	0.56	0.50	0.47	0.45
20	1.0	0.93	0.71	0.67	0.62	0.56	0.53	0.50

How to Convert: Find the factor for row spacing and band width and multiply this by the broadcast rate.

For Example: The broadcast rate is 1.0 lb/acre, row spacing is 30 inches and band width is 10 inches—multiply .33 by 1.0 to get 0.33 lb/acre on a 10-inch band.

Caution - Noxious Weeds

Mississippi Noxious Weeds being proposed by the Mississippi Department of Agriculture and Commerce (MDAC) (Rule 41: Regulation of Noxious Weeds Under Sections 69-25-1 through 69-25-47, Chapter 380, Laws of Mississippi 1974). Additional information on Mississippi Noxious Weeds will be available under Plant Pest Programs on the MDAC's Noxious Weed home page www.mdac.state.ms.us/Index.asp.

MISSISSIPPI NOXIOUS WEEDS

Common Name	Scientific Name	Habitat
Benghal dayflower	<i>Commelina benghalensis</i>	terrestrial
Brazilian satintail	<i>Imperata brasiliensis</i>	terrestrial
cogongrass	<i>Imperata cylindrica</i>	terrestrial
Chinese tallow tree	<i>Triadica sebifera</i>	terrestrial
giant salvinia	<i>Salvinia molesta</i>	aquatic
hydrilla	<i>Hydrilla verticillata</i>	aquatic
itchgrass	<i>Rotboellia exaltata</i>	terrestrial
tropical soda apple	<i>Solanum viarum</i>	terrestrial

Also, the MDAC has authority under the Mississippi Aquaculture Act of 1998 (Section 79-22-9) to regulate the cultivation and marketing of certain agricultural products. Under Public Notice of "Guidelines for Aquaculture Activities in Mississippi," the department further defined permitting requirements for the importation, selling, possessing, or transporting of species that are detrimental to the state's native resources. The Department of Wildlife, Fisheries, and Parks (DWFP) and the Department of Marine Resources may advise MDAC in issuing cultivation and marketing permits (Section 49-7-80). MDWFP determined the following species to be detrimental to the state's native resources. Sales and distribution of the following species are prohibited in Mississippi:

SALE AND DISTRIBUTION PROHIBITED IN MISSISSIPPI

Common Name	Scientific Name	Habitat
anchored waterhyacinth	<i>Eichhornia azurea</i>	aquatic
Brazilian Elodea	<i>Egeria densa</i>	aquatic
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	aquatic
hydrilla	<i>Hydrilla verticillata</i>	aquatic
melaleuca	<i>Melaleuca quinquenervia</i>	aquatic or wetlands
waterhyacinth	<i>Eichhornia crassipes</i>	aquatic
waterlettuce	<i>Pistia stratiotes</i>	aquatic

A list of federal noxious weeds is available on the APHIS home page www.aphis.usda.gov/. This list includes species or species groups that are not currently in the United States and present a real threat to agricultural, forest, urban, and natural areas. The list also includes species that are major weed problems elsewhere in the world and which currently have restricted distributions in the United States. **Movement of any Federal Noxious Weed, including seed and other propagules, into the United States and across state lines is prohibited.** See the Computer Aids section in this publication for additional web sites about non-native invasive weeds.

FEDERAL NOXIOUS WEEDS OCCURRING IN ADJACENT STATES

Common Name	Scientific Name	Habitat	States
cattail grass	<i>Setaria pallide-fusca</i>	terrestrial	Alabama, Louisiana
sessile joyweed	<i>Althernanthera sessilis</i>	terrestrial	Alabama
water lettuce	<i>Ottelia alismoides</i>	aquatic	Arkansas, Louisiana, Missouri

GLYPHOSATE PRODUCTS, FORMULATIONS, AND RATE CONVERSIONS

Product ^{1,2}	Manufacturer or distributor	Active ingredient Concentration (lb) ³		Surfactant recommended ⁴	Amount (oz/A) of product to apply according to rate required and glyphosate formulation					
		Acid (a.e.)	Salt (a.i.)		lb ae/A =	0.375	0.56	0.75	1.125	1.5
					lb ai/A (3 lb ae/4 lb ai) =	0.5	0.75	1.0	1.5	2.0
					lb ai/A (4 lb ae/5.4 lb ai) =	0.5	0.75	1.0	1.5	2.0
Accord Concentrate ⁵	Dow AgroSciences	4	5.4	Yes*		12	18	24	36	48
Accord SP ⁵	Dow AgroSciences	3	4	No		16	24	32	48	64
Aqua Star ⁵	Albaugh (Agri Star)	4	5.4	Yes		12	18	24	36	48
Aqua Neat ⁵	Cerexagi (Riverdale)	4	5.4	Yes		12	18	24	36	48
Aquamaster ⁵	Monsanto	4	5.4	Yes		12	18	24	36	48
Buccaneer	Tenkoz	3	4	Yes*		16	24	32	48	64
Buccaneer Plus*	Tenkoz	3	4	Yes*		16	24	32	48	64
ClearOut 41	Chemical Prod. Tech.	3	4	Yes		16	24	32	48	64
ClearOut 41 Plus*	Chemical Prod. Tech.	3	4	Yes*		16	24	32	48	64
ClearOut Pro Plus	Chemical Prod. Tech.	3	4	No		16	24	32	48	64
Cornerstone*	Agrilience	3	4	Yes*		16	24	32	48	64
Cornerstone Plus*	Agrilience	3	4	Yes*		16	24	32	48	64
Credit*	Nufarm	3	4	Yes*		16	24	32	48	64
Credit Extra*	Nufarm	3	4	No		16	24	32	48	64
Credit Duo*	Nufarm	3	3.97	Yes*		16	24	32	48	64
Credit Duo Extra*	Nufarm	3	3.97	No		16	24	32	48	64
Eagre ⁵	Griffin	4	5.4	Yes		12	18	24	36	48
Foresters ⁵	Riverdale	4	5.4	Yes*		12	18	24	36	48
Gly Star Plus*	Albaugh (Agri Star)	3	4	No		16	24	32	48	64
Gly Star Pro*	Albaugh (Agri Star)	3	4	No		16	24	32	48	64
Gly Star 5*	Albaugh (Agri Star)	4	5.4	Yes		12	18	24	36	48
Gly Star Original*	Albaugh (Agri Star)	3	4	Yes*		16	24	32	48	64
Gly-Flo	Micro-Flo	3	4	Yes*		16	24	32	48	64
Glyfos*	Cheminova	3	4	Yes*		16	24	32	48	64
Glyphos X-tra*	Cheminova	3	4	No		16	24	32	48	64
Glyfos Aquatic ⁵	Cheminova	4	5.4	Yes		12	18	24	36	48
Glyfos Pro ⁵	Cheminova	3	4	No		16	24	32	48	64
Glyphomax*	Dow AgroSciences	3	4	Yes*		16	24	32	48	64
Glyphomax Plus*	Dow AgroSciences	3	4	No		16	24	32	48	64
Glyphosate*	DuPont	3	4	Yes*		16	24	32	48	64
Glyphosate original*	Griffin	3	4	Yes*		16	24	32	48	64
Glyphosate VMF ⁵	DuPont	4	5.4	Yes		12	18	24	36	48
Glyphosate 4*	Farmsaver.com	3	4	Yes		16	24	32	48	64
Glypro ⁵	Dow AgroSciences	4	5.4	Yes		12	18	24	36	48
Glypro Plus ⁵	Dow AgroSciences	3	4	No		16	24	32	48	64

(continued)

GLYPHOSATE PRODUCTS, FORMULATIONS, AND RATE CONVERSIONS (continued)

Product ^{1,2}	Manufacturer or distributor	Active ingredient Concentration (lb) ³		Surfactant recommended ⁴	Amount (oz/A) of product to apply according to rate required and glyphosate formulation					
		Acid (a.e.)	Salt (a.i.)		lb ae/A =	0.375	0.56	0.75	1.125	1.5
					lb ai/A (3 lb ae/4 lb ai) =	0.5	0.75	1.0	1.5	2.0
			lb ai/A (4 lb ae/5.4 lb ai) =			0.5	0.75	1.0	1.5	2.0
Honcho	Monsanto	3	4	Yes*	16	24	32	48	64	
Honcho Plus*	Monsanto	3	4	Yes*	16	24	32	48	64	
Kleenup Pro ⁵	United Hort. Supply	3	4	Yes*	16	24	32	48	64	
Mad Dog*	AGSCO	3	4	Yes*	16	24	32	48	64	
Mirage	Platte	3	4	Yes*	16	24	32	48	64	
Mirage Plus*	Platte	3	4	Yes*	16	24	32	48	64	
Polado L	Monsanto	4	5.4	Yes	12	18	24	36	48	
Rattler	Helena	3	4	Yes*	16	24	32	48	64	
Rattler Plus	Helena	3	4	Yes*	16	24	32	48	64	
Razor ⁵	Riverdale	3	4	Yes*	16	24	32	48	64	
Razor Pro ⁵	Riverdale	3	4	No	16	24	32	48	64	
Rodeo ⁵	Dow AgroSciences	4	5.4	Yes	12	18	24	36	48	
Roundup Original RT	Monsanto	3	4	Yes*	16	24	32	48	64	
Roundup Original	Monsanto	3	4	Yes*	16	24	32	48	64	
Roundup Original II*	Monsanto	3	4	Yes*	16	24	32	48	64	
Roundup Original II CA*	Monsanto	3	4	Yes*	16	24	32	48	64	
Roundup Custom*	Monsanto	4	5.4	Yes	12	18	24	36	48	
Roundup Ultra Max*	Monsanto	3.7	5	No	13	19	26	40	52	
Roundup Pro ⁵	Monsanto	3	4	No	16	24	32	48	64	
Roundup Pro Concentrate ⁵	Monsanto	3.7	5	No	13	19	26	40	52	
Roundup UltraDry*	Monsanto	64.9%	71.4%	No	10	14	19	29	38	
Roundup ProDry ⁵	Monsanto	64.9%	71.4%	No	10	14	19	29	38	
Roundup WeatherMax*	Monsanto	4.5	5.5	No	11	16	21	32	42	
Silhouette	Agrilience	3	4	Yes*	16	24	32	48	64	
Touchdown CF	Syngenta	3	3.6	No	16	24	32	48	64	
Touchdown Pro ⁵	Syngenta	3	3.6	No	16	24	32	48	64	
Touchdown 5	Syngenta	3.4	5	No	14	21	28	42	56	
Touchdown*	Syngenta	3	3.6	No	16	24	32	48	64	

¹ Glyphosate products marked with "*" can be applied over-the-top of "Roundup Ready" crops. Please refer to glyphosate product label for specific restrictions.

² Glyphosate products marked with "\$" are labeled for noncrop (aquatic, forestry, industrial, pasture, and/or turf) use only.

³ Like many other herbicides, the glyphosate molecule is formulated as a salt. The weight of the active ingredient (a.i.) varies, depending on the chemical elements used to form that salt. The salt portion of the active ingredient does not contribute to actual weed control. Because the weight of the salt used in the different glyphosate formulations varies, a better measure among glyphosate products is the comparison of the actual amount of glyphosate, i.e. acid equivalent (a.e.). The a.e. rate measurement allows one to compare the actual glyphosate rate among the different salt formulations. The a.e. measurement is the only true method to compare glyphosate rates among the different salt formulations.

⁴ Some formulations of glyphosate "*" contain some surfactant; however, additional surfactant is required with certain spray volumes. See product label for specific surfactant rates and uses.